

NOTES ON THE OCCURRENCE OF THE CRUSTACEAN ALONOPSIS IN AMERICA, WITH DESCRIPTION OF A NEW SPECIES.

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The presence of a genus of fresh-water Entomostraca belonging to the order *Cladocera*, the genus *Alonopsis*, does not seem to have been recorded hitherto in America. A species from Wisconsin described as *Alonopsis media* Birge¹ is now regarded as a variety of *Alonopsis latissima* Kurz.² *Alonopsis latissima* has been collected in almost all parts of the United States and in South America,³ as well as in the Eastern Hemisphere, but the species has been removed from the genus *Alonopsis* and the genus *Pseudalona* Sars³ erected for it. Thus no true *Alonopsis* remains on record for America.

It has, therefore, been a matter of interest to find two species of *Alonopsis* in the course of determining the food of young fishes of New England lakes. While investigating the Entomostracan plankton of Sebago Lake, Maine, under the direction of the United States Bureau of Fisheries, small-mouthed black bass, *Micropterus dolmieu*, 38 to 48 mm. long, when taken from a certain locality were found to have eaten as part of their food two species of this genus, namely, *Alonopsis elongata* Sars on July 25, 1906, July 31, 1906, and August 16, 1908, and also *Alonopsis aureola* on July 25, 1906. This second species is new, and is hereinafter described. Similarly, Dr. W. C. Kendall, of the United States Bureau of Fisheries, in his investigations of the Salmonidæ of Sunapee Lake, New Hampshire, captured a few specimens of the Sunapee golden trout, *Salvelinus aureolus*, 27 and 28 mm. long, on April 23, 1910. These have been examined by the writer for their food, and there appeared also in their stomachs *Alonopsis aureola*.

¹ E. A. Birge. Notes on Cladocera. Transactions of the Wisconsin Academy of Sciences, Arts, and Letters, vol. 4, 1876-1877 (1879).

² Herrick and Turner. Copepoda, Cladocera, and Ostracoda of Minnesota. Geological and Natural History Survey of Minnesota, Second Report of the State Zoologist for 1893 and 1894. Zoological series, vol. 2, 1895.

³ G. O. Sars. Contributions to the Knowledge of the Fresh-water Entomostraca of South America as shown by Artificial Hatching from Dried Material. Archiv Math. Nat. Kristiania, vol. 23, 1901, No. 3.

These findings of *Alonopsis* are the only ones for this genus in America. *Alonopsis elongata* has been known all over Europe¹ for many years. *Alonopsis aureola* has not been heretofore known. All the specimens found in America of both species are from the alimentary tracts of young fish, by whom they had been seized as food.

All the specimens of the black bass in question were captured around rocks in several feet of water immediately off shore. There was accessible near by, at a distance of 50 to 75 meters, a weedy cove. The food with which *Alonopsis* was associated was predominantly the Entomostraca of the open lake which had risen to the surface at night and spread to the shore. These the young black bass fed upon according to their habits in this lake. There were also a few *Polyphemus pediculus* (Linnæus), which prefer clear water several feet in depth near shore, but may occur anywhere. There was also a good sprinkling of true littoral and hydrophytophilous forms as *Ceriodaphnia reticulata* (Jurine), *Acroperus harpæ* Baird, various species of *Alona*, etc. Therefore the habitat of the two species of *Alonopsis*, as they occur in Sebago Lake, is not indicated precisely.

The golden trout of Sunapee Lake is also a lake species, breeding, so far as known, only on a shoal in mid lake. The young trout referred to had eaten along with *Alonopsis aureola* only *Polyphemus pediculus*, which lives, as mentioned, mainly in littoral waters free from weeds. The trout were taken in such a place, but they had access at 100 meters distance to a weedy brook, or, perhaps, the inhabitants of the weedy brook had access to them. During another season Doctor Kendall took young Sunapee golden trout from this brook. Except for two *Cyclops* the food of this second lot of young trout was insects exclusively, in larval, pupal, and adult stages.

At Sebago Lake the effort to find specimens of *Alonopsis* alive was thorough, but neither around the rocks where the bass were captured nor in the weedy cove could they be found. Neither did the young of other species of fish such as catfish, *Ameiurus nebulosus*; or yellow perch, *Perca flavescens*; chub, *Semotilus bullearis*; or sucker, *Catostomus commersonii*, which frequented the cove, and fed abundantly upon Entomostraca yield any specimens of either species. The chances of finding a species of Entomostraca in the cove, if it occurs there, are so much better than those of finding it off the rocky shore, if it occurs there, that the conjecture is hazarded, that in New England lakes *Alonopsis elongata* and *Alonopsis aureola* may rarely be found, especially in the early morning, in clear littoral waters several feet in depth, under the protection of rocky ledges or banks.

¹ Wilhelm Lilljeborg. Cladocera Sueciæ. Nova Acta Regiæ Societatis Scientiarum Upsaliensis, Serief Tertiæ, vol. 19. 1900.

Family CHYDORIDAE Leach (LYNCEIDAE Baird).

Subfamily CHYDORINA Leach.

ALONOPSIS AUREOLA, new species.

Plates 42, 43.

Female.—Length, 1.9 mm.; height, 0.95 mm. The form (fig. 1) is long and low; upper and lower margins are nearly parallel. The head points forward, and the posterior part of the body is truncated. In general proportions it resembles *Alonopsis elongata* Sars. The upper contour is nearly straight in the body region, but slopes downward more and more abruptly as it approaches the end of the rostrum. The posterior margin reaches to the full height of the dorsal margin, is slightly oblique and straight until it reaches the postero-ventral angle. This lower posterior angle is more strictly to be regarded as cut off at an angle of about 45° with the longitudinal axis of the body, leaving a sinuous margin instead of the usual sharp or rounded angle. Tracing the ventral margin forward, a concave portion bearing short setæ runs to a place slightly anterior to the middle of the body, which is also the place of greatest depth; then changing direction slightly, another portion, also slightly concave and setigerous, runs forward and joins the anterior margin without further peculiarity.

The head (fig. 2) is low, narrow, and pointing forward; the rostrum is short, and from side view is obtuse. There is a slight cervical indentation. The compound eye is quite large, situated remote from the end of the rostrum, and the superior margin. The ocellus, or *macula nigra*, is one-half the diameter of the compound eye, and nearer the end of the rostrum. The labrum has a large obtuse anterior lobe of usual form and a slender horizontal lobe.

The test or shell of the body possesses markings unlike those of other species of *Alonopsis*. Diagonally across the main portion of the test, at an angle of 45° , are fine lines, 30 to the millimeter. Those reaching the ventral margin anterior to the deepest point arrange themselves progressively so as to be parallel with the anterior margin. These lines do not encroach closely upon the cervical region. The skin under the exoskeleton in some cases adds to the markings, dividing the spaces between the diagonal lines into rectangular meshes. Such meshes do not appear in tests from which the skin or epidermis has been removed. In addition to these lines the entire test is covered with fine striæ which occasionally anastomose. The general effect of these lines under high magnification resembles the rows of papillæ in the human palm, and the striæ observed in *Alonella excisa* (Fischer). These striæ run, in general, longitudinal, parallel, in side view, with the upper margin (fig. 3 B). On the top of the head, however, there is more or less of a concentration of these striæ around

a very distinct keyhole-shaped space, the effect at this place being like that of a cowlick (fig. 3 A).

The first antenna or antennule (fig. 2) is short and thick, equaling or slightly exceeding the rostrum. The terminal olfactory setæ are delicate and equaling the antennule in length. The seta usual in this genus on the posterior border has not been observed; neither is the offset in which it usually stands present. Anteriorly, near the end of the antennule is such an offset, but a seta was not observed. Observations on this point are not conclusive, due, as shown later, to the condition of the material.

The second antenna, or antenna proper (fig. 4), is with 7 swimming setæ, the usual seta upon the first segment of the inner ramus being reduced to a slender seta-like spine; the spines, therefore, 4, resembling *Acroperus*. Setæ $\frac{0}{0} \frac{0}{1} \frac{2}{2}$, spines $\frac{1}{0} \frac{0}{0} \frac{1}{1}$. Spines, except as noted, quite strong; setæ segmented.

The mandible is slender and curved.

The maxilla (fig. 5), as in *Camptocercus* and *Acroperus*, with 3 retrorse teeth, the distal one smooth and rudimentary; the proximal two ciliated, quite strong, and sub-equal in size.

The feet are distinctly Lynceid in character. The first two pairs (figs. 6 and 7) are hardly distinguishable from those of *Alonopsis elongata* as figured by Dr. W. Lilljeborg.¹ The third (fig. 8) and fourth (figs. 9 and 10), however, resemble those of *Camptocercus* more closely in the number of setæ and the development of the etenoid setæ. The fifth and sixth feet, if present, did not come under observation and lack of material prevented adequate search for them.

The postabdomen (fig. 11) is broad and strong, and is not long. The dorsal or spine-bearing margin and the ventral margin are nearly parallel; the former broadly rounded at its end and not produced beyond the claw-bearing extension of the latter. The distal half of the dorsal margin, that is, beyond the anal opening is armed with a double row of 11 small slender spines, slightly larger on the rounded end of the postabdomen. There are no lateral denticles. The claw is upon a fleshy base which has no spinules. The claw itself has a spine at the base and at the middle of its concave border, and between them fine spinules. The distal half of the claw is smooth.

Male.—Unknown.

Color is yellowish-golden.

Occurrence.—The only specimens of this species are from the alimentary tracts of fish by whom they were captured as food. The condition of the specimens was not entirely satisfactory, especially for internal structures. Specimens taken as follows: One specimen from small-mouthed black bass, 31 mm. long, Sebago Lake, Maine,

¹ Cladocera Sueciae, Nova Acta Regiæ Societatis Scientiarum Upsaliensis, vol. 19, pl. 65, figs. 11 and 12.

July 25, 1906; 3 specimens from Sunapee golden trout, 27 and 28 mm. long, Sunapee Lake, New Hampshire, April 23, 1910.

Habitat.—Apparently they live in fresh water lakes in water several feet in depth, off rocky shore.

The specific name refers to the color of the shell, as well as to the specific name of the trout from whom the greater number of specimens and the type were taken.

Type.—Cat. No. 44366, U. S. N. M., from the alimentary tract of *Salvelinus aureolus*, Sunapee Lake, New Hampshire, April 23, 1910.

EXPLANATION OF PLATES.

PLATE 42.

- FIG. 1.—*Alonopsis aureola*, female from Sunapee Lake, New Hampshire, April 23, 1910. Specimen No. 1, the type. Side view. $\times 32$.
 2.—Specimen No. 2. Head, lateral view. $\times 75$.
 3.—Specimen No. 2. A. Shell markings in median line, posterior part of head. $\times 275$. B. Shell markings on side of test. $\times 275$.
 4.—Specimen No. 2. Second antenna, or antenna proper: *a*, upper or outer ramus; *b*, lower or inner ramus. $\times 275$.
 5.—Specimen No. 3. Maxilla. $\times 1160$.
 6.—Specimen No. 3. Left first foot. A. Exterior view. $\times 275$. B. Interior view. $\times 275$.

PLATE 43.

- FIG. 7.—*Alonopsis aureola*. Specimen No. 3. Right second foot, outer view. $\times 275$.
 8.—Specimen No. 3. Right third foot, inner view. $\times 275$.
 9.—Specimen No. 3. Left fourth foot, inner view. $\times 275$.
 10.—Same as fig. 9, flattened under cover glass, outer view. $\times 275$.
 11.—Specimen No. 1. Postabdomen, lateral view. $\times 90$.